

Date: Wednesday, 16/07/2008 8:55:18 AM
 User: Julie Lecocq

Process Sheet

Customer : CU-DAR001 Dart Helicopters Services	Drawing Name : 412 X-TUBE INST, LOW NARROW AFT
Job Number : 40547	
Estimate Number : 13211	
P.O. Number :	Part Number : D412664205TRN
This Issue : 16/07/2008 S.O. No. :	Drawing Number : D412-664 -245 REV C
Prsht Rev. : NC	Project Number : N/A
First Issue : - / - Type : CROSSTUBES	Drawing Revision : C
Previous Run : 39073	Material :
Written By :	Due Date : 21/07/2008 Qty: 1 Um: Each
Checked & Approved By : <u>JLO 08.7.14</u>	
Comment : Est Rev:A New Issue 08-03-06 DD verified by:ec Est Rev B 08.04.02 Removed polish EC verified by: DD	

Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
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1.0	D6009129	Crosstube Material
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Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty Part number Description Batch

1 D6009-129 Crosstube B34691

Check OD = 3.500"; ID = 2.250"

A.M 08.08.14 6

2.0	MORI SEIKI	MORI SEIKI CNC LATHE LARGE
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**Comment:** MORI SEIKI CNC LATHE LARGE

1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA690

2-Turn first side as per Folio FA690

3- File transition lines smooth.

A.M 08.08.14 0 (P70)

3.0	QC1	INSPECT ALL DIM TO DIM SHEET
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**Comment:** INSPECT ALL DIM TO DIM SHEET

A.M 08.08.14 0

4.0	MORI SEIKI	MORI SEIKI CNC LATHE LARGE
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**Comment:** MORI SEIKI CNC LATHE LARGE

1-Turn second side as per Folio FA690

2- File transition lines smooth.


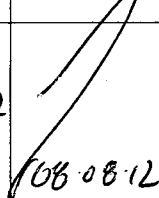
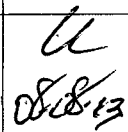
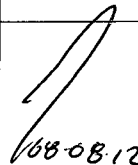
3- Remove sand and plugs

A.M 08.08.14 0

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D412-664-205TRN PAR #: _____ Fault Category: LG & tube NCR: (Yes) No DQA: 11 Date: 08.08.21
(training) QA: N/C Closed: 11 Date: 08/08/21

NCR: <u>40547</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
08-08-12	2.0	Tube was turned. 0.035" off center. on one side. RE operator counted 4 notches on each jaw in the chuck, but tube was still not centered, & measured the top. R.C: 1 jaw on the chuck had been machined, causing it to be slightly shorter than the rest. operator was not aware of this.		Scrap & destroy the tube, it is not needed for bend development. Replace: B 34691 Qty 1	08.08.12	 08-08-12	 08-08-12	 08-08-12

NOTE: Date & initial all entries

Date: Wednesday, 16/07/2008 8:55:18 AM
User: Julie Lecocq

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 412 X-TUBE INST, LOW NARROW AFT

Job Number: 40547

Part Number: D412664205TRN

Job Number:



Seq. #:

Machine Or Operation:

Description :

4-Scribe part # and batch # using vibrating stylus as per Dwg D412-664-245
engrave on outside of tube)

Inside of Cuff(Donot

Q.M 08.08.14

5.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

Q.M 08.08.14

6.0

QC8

SECOND CHECK



Comment: SECOND CHECK

AWM 8-8-14

7.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

AWM 8-8-14

8.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

Q.M 08.08.15

9.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Identify and stock in kanban rack

Location: X-TUBE CELL

AWM 8-8-15

10.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

08/08/19

Job Completion



MF 08-08-15

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART

DESIGN <i>QD</i>	DRAWN BY <i>QD</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D412-664-245	REV. C SHEET 1 OF 3
DATE 07.03.29		TITLE CROSSTUBE ASS'Y (412 LOW-N AFT) NTS	
A	06.12.01	NEW ISSUE	
B	07.03.01	CHG CUFF AREA, CHG RUBBER CUSHION	
C	07.03.29	CHG RIVET AND RUBBER CUSHION	

RELEASED07.04.24 *[Signature]***PARTS LIST:**

Qty	Part Number	Description
X	D412-664-245	CROSSTUBE ASSEMBLY (412 LOW-NARROW AFT)
1	D6009-129	CROSSTUBE
2	D2856-600-1009	ABRASION STRIP
1	D2896-1	SUPPORT
2	D3189-1	CHAFING SHIELD
2	D3595-063-570	RUBBER CUSHION
2	D3606-1	CUFF
44	CR3212-4-07	RIVET (OR M7885/3-4-07)
4	MS21920-28	CLAMP
2	MS21920-30	CLAMP (OR MS21920-32)
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 2) MATERIAL: MANUFACTURED FROM D6009-129
FINISHED LENGTH = 123.59±0.020 (BEFORE BENDING/TRIMMING)
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE.
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2856-600-1009 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) APPLY A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 12) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.
- 13) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 14) INSTALL D3606-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE. SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 15) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

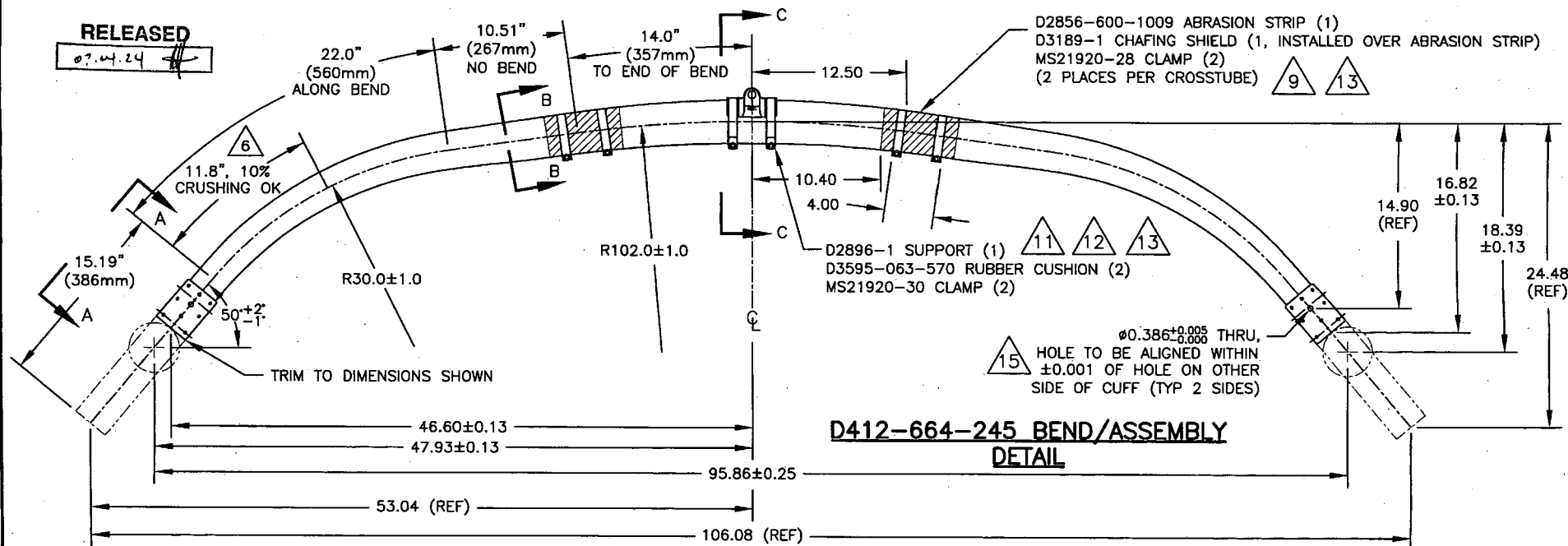
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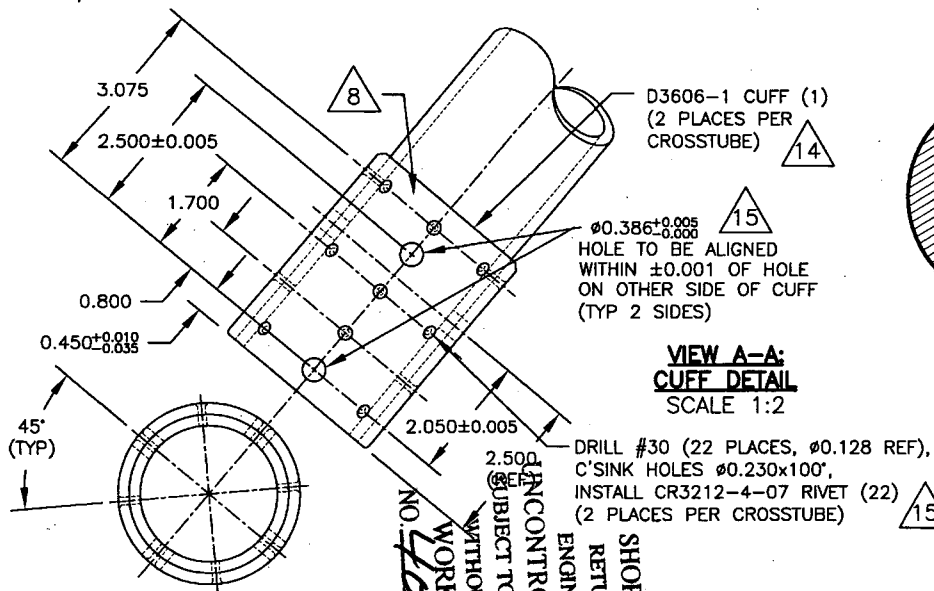
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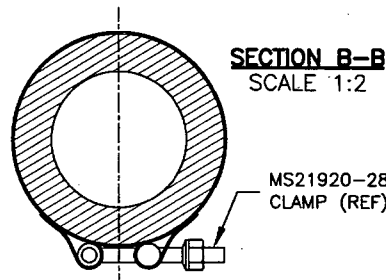
07.04.24



**D412-664-245 BEND/ASSEMBLY
DETAIL**



**VIEW A-A:
CUFF DETAIL
SCALE 1:2**



**SECTION B-B
SCALE 1:2**

APPLY MAGNOBOND
BETWEEN D2896-1 AND
THE CROSSTUBE

11

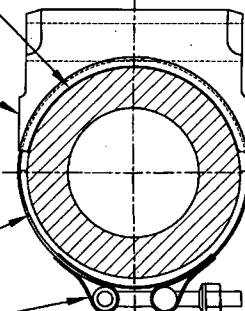
D2896-1
SUPPORT
(REF)

D3595-063-570
RUBBER CUSHION
(UNDER CLAMP, REF)

12

MS21920-30
CLAMP (REF)

**SECTION C-C
SCALE 1:2**



13

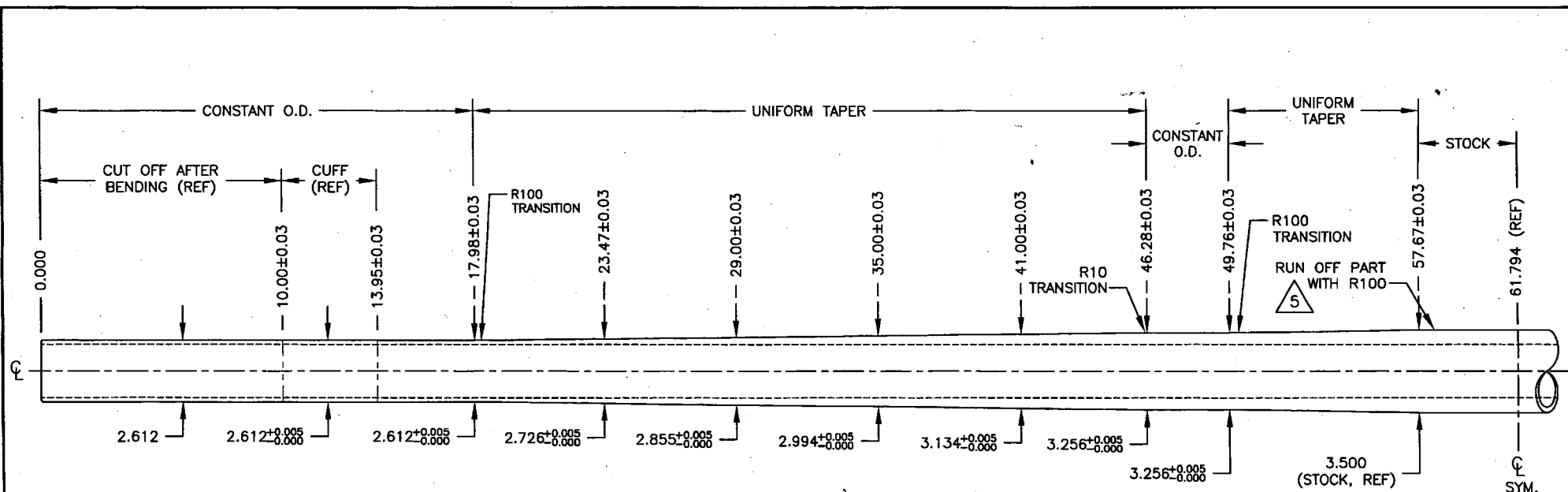
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DESIGN	07	DRAWN BY	07
CHECKED	07	APPROVED	07
DATE	07.03.29		

DART	DART AEROSPACE LTD. HARRISBURG, ONTARIO, CANADA
DRAWING NO. D412-664-245	REV. C SHEET 2 OF 3
TITLE CROSSTUBE (412 LOW-NARROW AFT)	SCALE 1:8

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D412-664-245 MACHINING DETAIL

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DATE	07.03.29	DRAWING NO.		D412-664-245	
TITLE		CROSSTUBE (412 LOW-NARROW AFT)		REV. C SHEET 3 OF 3 SCALE	

Abstract

DART AEROSPACE LTD		Work Order: 46547
Description: Crosstube Assembly (412 Low Narrow Aft)		Part Number: D412-664-245
Inspection Dwg: D412-664-245 Rev: C		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article ☐ Prototype

	Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	3.256	+0.005/-0.000	3.260	/			
	3.256	+0.005/-0.000	3.260	/			
	3.134	+0.005/-0.000	3.139	/			
	2.994	+0.005/-0.000	2.999	/			
	2.855	+0.005/-0.000	2.860	/			
	2.726	+0.005/-0.000	2.731	/			
	2.612	+0.005/-0.000	2.617	/			
	2.612	+0.005/-0.000	2.617	/			
	2.612	+0.005/-0.000	2.617	/			
SIDE B	3.256	+0.005/-0.000	3.260	/			
	3.256	+0.005/-0.000	3.260	/			
	3.134	+0.005/-0.000	3.139	/			
	2.994	+0.005/-0.000	2.999	/			
	2.855	+0.005/-0.000	2.860	/			
	2.726	+0.005/-0.000	2.731	/			
	2.612	+0.005/-0.000	2.617	/			
	2.612	+0.005/-0.000	2.617	/			
	2.612	+0.005/-0.000	2.617	/			
	123.59	+/-0.020	123.6125	✓			Acceptable tubes get cut

Measured by: G.M	Audited by: A.W.M	Prototype Approval: N/A
Date: 08.08.14	Date: 8-8-14	Date: N/A

Rev	Date	Change	Revised by	Approved
A	08.07.03	New Issue (P/O D412-664-205)	KJ/DD	